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THE

VALUE OF ABSENT "TENDON-REFLEX" AS A DIAGNOSTIC SIGN IN LOCOMOTOR ATAXIA.

WITH AN ANALYSIS OF EIGHT CASES.

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THE VALUE OF ABSENT "TENDON-REFLEX" AS A DIAGNOSTIC SIGN IN LOCOMOTOR ATAXIA, WITH AN ANALYSIS OF EIGHT CASES.

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SINCE Westphal's paper[1] in regard to the significance of absent tendon-reflex in the early stage of locomotor ataxia, I have devoted a great deal of time for the purpose of carefully testing the value of this symptom, which has been declared by Westphal to be a constant feature of commencing sclerosis of the posterior columns of the spinal cord. The two forms of reflex tendinous phenomena investigated by Erb[2] and Westphal,[3] and called by them the knee phenomenon (*Knie* or *Unterschenkel-Phänomen*) and foot phenomenon (*Füss Phänomen*), were described as early as 1875. It has been found that if the ligamentum patellæ of the loosely hanging leg or the tendon of the quadriceps femoris of a person in health be struck a smart blow (with the side of the hand, for instance), a more or less violent *kick* will follow, while if the tendo Achillis be struck in the same manner the heel will be raised. In certain conditions, such as sclerosis of the lateral columns, this excitement of the tendon-reflex is so great that if the patient merely stamps his heel upon the floor the whole limb will be agitated by spasmodic movements. In locomotor ataxia it is claimed that such an excitation is impossible, and that the tendon-reflex is absent in all muscles of the affected lower extremity, with the exception of the vasti interni. So important does Erb consider this symptom to be that in his article upon Tabes in Ziemssen's Cyclopædia[4] he says: "In all typical and well-developed cases of tabes, reflex action of the tendons is entirely wanting, even though reflex action of the skin may be present, and even increased. In only one case which I count as tabes, but in which there was as yet no ataxy, but only some initial symptoms, could the presence of reflex action of the tendons of the patella be demon-

[1] Berliner klinische Wochenschrift, 1878, No. 1, page 1.
[2] Archiv für Psychiatrie und Nervenkrankh., B. v., H. 3, page 792, 1875.
[3] Ibid., page 803.
[4] Cyclopædia of the Practice of Medicine, Am. Trans., vol. xiii., page 575.

strated. Whenever the case had advanced to the development of ataxia, or even slight indication of the same, reflex action of the tendons was entirely lost."

Westphal's experiments in regard to this abolition of reflex irritability of the tendons form the basis of such positive assertions that his views have been received almost without reserve by many clinicians. In England, however, cases have been reported which are exceptional so far as Westphal's doctrine is concerned, and in a discussion of a paper read by Althaus before the British Medical Association at its last meeting at Bath,[1] Gowers, Sawyer, and others brought forward several examples. Gowers had seen three cases in which the tendon-reflex was *not* absent, and, as a fact in regard to the occasional absence of this tendinous condition in health, he stated that out of three hundred persons examined several were found in whom the tendon-reflex could not be excited.

Dr. Bannister, of Chicago,[2] in a recent article upon the subject, presented two cases of locomotor ataxia, in both of which the tendon-reflex was if anything exaggerated.

The following eight cases of unmistakable sclerosis of the posterior columns, some of them presenting changes at the fundus oculi, will, I think, throw light upon this subject. For the brief notes I am indebted to Dr. Claddek, resident physician of the hospital. They include the histories of seven men and one woman. The tests for the tendon-reflex were most carefully made, the skin being bared and the force of the blow tested.

Case I. J. McG., aged forty-five, sailor.

Family history: Good.

Previous history: Patient, about twenty years ago, had a sore on his penis followed by secondary symptoms; eight years ago had clap, which had resulted in stricture. His habits had been intemperate, and his occupation subjected him to hardships and exposure. No cardiac, lung, or renal trouble.

Present trouble: Eight years ago, while at sea, he noticed for the first time shooting pains from hips to knees and across back; this was followed a year or two later by difficulty in walking, headache, and buzzing in the ears; pains now became worse, and there was a feeling of constriction around waist; sexual appetite increased to an excessive degree, and he suffered almost continually from priapism; gait became staggering and unsteady, and he was obliged to keep eyes on floor; bowels constipated; feet and legs numb.

Present condition: Patient is a large, powerful man, bronzed by exposure, and very muscular; has lost no flesh or strength, has no paraly-

[1] British Medical Journal, August 31, 1878, page 318.

[2] Journal of Nervous and Mental Disease, October, 1878, page 656.

sis, cannot stand with eyes closed, walks with feet wide apart, which he throws well out and comes down on his heels. He has "spinal epilepsy" at night, sensibility is diminished, bladder incontinent at times when fatigued, no pain in back, no tenderness on pressure, no ocular symptoms. Marked loss of coördination.

Tendon-reflex is extinguished in all of the muscles excepting the vasti interni.

Case II. A. F., aged fifty-three, married.

Family history: Good.

Previous history: Patient has been a temperate man; no evidences of syphilis; has six children living and healthy, the youngest being six years old.

Present trouble: Twelve years ago his legs became unsteady, and he could not walk on a slippery pavement or in the dark, feet became numb, and he had shooting pains in the lower extremities. Two years later had pains in upper extremities, with numbness of fingers. He noticed difficulty in writing and in making fine movements. A little over a year ago there was a feeling of constriction around the waist, and for the first time slight incontinence of urine. Six months ago he was compelled to go to bed, not from loss of power, but from inability to control movements of legs.

Present condition: Patient is still confined to bed; has no loss of power whatever; movements of legs rapid and forcible, but entirely beyond control; marked loss of sensibility of lower extremities, except sense of temperature; well-marked ataxia of upper extremities; pains in limbs, joints, and viscera. Mental condition good, special senses perfect.

Tendon-reflex is absent excepting in the vasti interni muscles.

Case III. B. J. B., aged fifty-four, single.

Family history: Phthisis.

Previous history: Patient has been a hard drinker; never had syphilis, but he indulged in sexual gratification to an excessive degree. Fourteen years ago he noticed that sexual desire was increased, and erections were vigorous; his legs became numb; soles of feet "had a spongy feeling;" staggering gait; neuralgic pains in lower extremities, and almost complete inability to walk in the dark. Five years later he was compelled to give up work (piano-making), "on account of clumsiness of fingers." Bowels were constipated; no trouble with bladder.

Present condition: Patient is a man of moderate strength; can arise from chair without assistance, and can stand alone with eyes open; gait is ataxic; while sitting down he can kick his legs vigorously; no loss of power whatever; almost complete anæsthesia of lower extremities; no atrophy or contractures of muscles. Special senses unimpaired, except vision; atrophy of both optic disks; has feeling of constriction

around waist; bowels constipated; slight incontinence of urine. Mental condition good.

Tendon-reflex of lower extremities is completely extinguished.

Case IV. J. W., aged fifty-two, married.

Family history: Epilepsy; no other disease.

Previous history: Uterine trouble; epilepsy nocturnal in character, occurring first at menstrual epochs; has never been pregnant. About twenty years ago (a year or two after convulsions) noticed headache, vertigo, pain in back, which would shoot down the limbs and through body; marked loss of coördination; general health failed; bowels constipated. The symptoms became worse, with occasional remissions up to seven years ago, when she was confined to bed or chair, being unable to walk without assistance. Epileptic attacks up to a year ago. Loss of coördination, with but very slight loss of power; "spinal epilepsy;" sensation of constriction about the waist and ankles; staggering gait; looking at floor constantly while walking; unable to walk in the dark; brings heels down with a stamp; cannot stand with eyes closed, or even with eyes opened if not looking at floor; marked ataxia of both upper and lower extremities, and impairment of sensibility are the prominent symptoms at present. Mental condition and intellect good; bowels constipated; urine at times alkaline, with deposits of phosphates and epithelium. Examination of chest shows the evidences of chronic bronchitis. Heart normal. Inspiration accomplished with an apparent effort, and is done mainly through action of diaphragm. Tongue protrudes straight and without tremor. During the past year she has made remarkable progress towards apparent recovery, being able to walk with a cane. Vision $\frac{20}{40}$; ophthalmoscopic examination reveals atrophy of both nerves to a slight extent. Tendon-reflex is wanting in all of the muscles of lower extremities, excepting the vasti interni.

Case V. F. A., aged fifty-nine, married.

Family history: Good.

Previous history: Patient has always been a healthy man, temperate, no history of syphilis.

Present trouble: In 1864 patient noticed numbness of lower extremities, unsteady gait, pains in back and legs and thighs; could not walk in the dark. Two years later there was a feeling of constriction around waist, dimness of vision, and extreme difficulty in performing complicated movements. No loss of power. No trouble of bladder or rectum. Four years ago he had a convulsion, which was probably epileptic; since then has had four or five; the last one occurred eighteen months ago.

Present condition: Patient is a large, muscular man. He cannot arise from chair without using hands, nor stand without assistance; in attempting to walk he spreads his legs, throws feet far out, and comes

down on heels. There is no muscular atrophy or contracture. No loss of power in legs. Almost complete anæsthesia of lower extremities; sensation but slightly impaired in the upper extremities. Tendon-reflex is markedly exaggerated. A slight blow on the ligamentum patellæ produces a violent response, which is repeated again and again with increased violence (sometimes amounting to over two hundred movements). Capillary circulation of legs good. Organs of special senses, excepting the eyes, are unaffected. Atrophy of both disks to a varying extent.

Case VI. J. F., aged fifty-seven, married.

Family history: Good.

Previous history: Patient has been a temperate man, and has always enjoyed good health up to onset of present trouble. Two years ago he had an attack of jaundice, and at the same time noticed difficulty in walking, numbness of lower extremities, feeling of constriction around waist and ankles; no headache or pain in back; characteristic pains in lower extremities. Difficulty in walking steadily progressed. Six months ago his hands became affected. Sexual desire for the last two years has been extinguished.

Present condition: Patient is anæmic and is of cachectic appearance; can arise from a stool unassisted; cannot stand with eyes closed; gait is ataxic; no atrophy or paralysis; marked anæsthesia. Sensibility to temperature remains, but is impaired; bowels constipated; slight incontinence of urine; has shooting pains in extremities, with marked loss of coördination. Mental condition depressed, and he has an anxious expression. Power of legs perfect. Tendon-reflex is well marked in all of the muscles of lower extremities.

Case VII. J. G., aged forty, married.

Family history: Unimportant.

Previous history: Patient has been a moderate drinker; he denies syphilis, and fails to show evidences of it. Ataxia commenced in 1874; at that time there was difficulty in walking in the dark, numbness of legs, — could not tell what he was walking on; also experienced shooting pains down legs, constriction around waist, and frontal headache. There was "spinal epilepsy" in left leg only. Sexual desire was not abnormal. Incontinence of urine, after unusual exertion, was noticed six months later.

Present condition: Patient is rather spare and poorly nourished; hair gray; capillary circulation feeble; gait decidedly ataxic; cannot stand with feet together and eyes closed; in walking he throws feet out, and comes down on heels. There is anæsthesia of lower extremities and ataxia of both extremities. Power of legs normal. Vision impaired.

Tendon-reflex increased; is much more than normal in all of the muscles.

Case VIII. J. L., aged fifty-nine, married.

Family history: Good.

Previous history: Patient has been a hard drinker; has had frequent attacks of "subacute rheumatism," and in 1859 had an attack of acute nephritis.

Present trouble: In 1861 patient noticed difficulty in walking, especially in the dark; would stumble, and sometimes fall; feet felt asleep; could not tell what he was walking on; bowels constipated; no trouble with bladder. Symptoms steadily progressed up to 1867, with occasional remissions; at this time was obliged to use crutches. At the onset of trouble his sexual desire and capacity were increased. Pains in lower extremities. For the last few years his condition has remained unchanged.

Present condition: Patient is a large man. No muscular atrophy or contractures, no loss of power whatever; cannot stand with eyes closed, but can with them open; cannot tell where his feet are when eyes are closed; well-marked ataxia of both upper and lower extremities; sensibility, excepting that to temperature, diminished; special senses almost unimpaired, except slight dimness of vision due to atrophy. Tendon-reflex well marked, being rather more than normal.

Of these cases, then, one half present Westphal's symptom, while in the other, the tendon-reflex is not only present, but in some instances is markedly increased, there being no apparent involvement of the lateral columns, or any other part of the spinal cord. The cases present all manner of distributed posterior sclerosis, and the cervical, dorsal, and lumbar regions are implicated. In Case IV., for instance, it is probable that there is some cerebral sclerosis as well, but in this case the "knee phenomenon" was absent. In Case V. the most remarkable of all, the irritability of the tendons was greater than I have ever seen it in any other form of spinal disease. When the ligamentum patellæ was struck ever so lightly, the movement of the foot would begin, and without fresh stimulation continue for some time, increasing in frequency, the intervals growing less. In this case the triceps, as well as the flexors of the fore-arm, were easily put in motion.

In regard to the stage of the disease, I regret to say that most of these cases presented advanced symptoms. Case VI., however, has been affected but for two years; still he presented in addition to the pains and other symptoms a well-marked tendon-reflex.

It would seem, therefore, as if the absence of the patellar tendon-reflex were not so valuable a diagnostic sign as it has been said to be in the disease under consideration, but there can be no doubt of the fact that when its absence is coupled with the so-called "lightning pains," plantar anæsthesia, and dimness of vision, there is reason for apprehension.

AN ANALYSIS OF EIGHT CASES OF LOCOMOTOR ATAXIA AT PRESENT AT THE HOSPITAL FOR EPILEPTICS AND PARALYTICS, NEW YORK CITY.

No.	Sex.	Age.	Duration.	Probable Cause.	Ataxic Members.	Location and Character of Pain.	Tendon-Reflex.	Disturbance of Surface Sensation.	Ocular Symptoms.	Cerebral Symptoms.
1	M.	45	8 years.	Syphilis and exposure.	Legs.	Back and thighs.	Absent.	Anæsthesia.	None.	Vertigo.
2	M.	53	12 "	Unknown.	Legs and arms.	Arms, legs, viscera.	"	"	None.	None.
3	M.	54	14 "	Excessive venery.	" " "	Legs.	"	"	Atrophy of optic nerve.	"
4	F.	52	20 "	Unknown.	" " "	Back, legs.	"	"	Atrophy of optic nerve.	Vertigo and epilepsy.
5	M.	59	14 "	"	Legs.	" "	Increased to marked degree.	Most in lower extremity.	Atrophy of optic nerve.	Occasional epileptic attacks.
6	M.	57	2 "	"	Legs and arms.	Legs.	Well marked.	Anæsthesia.	Normal.	None.
7	M.	40	4 "	"	" " "	Legs.	Increased.	"	Impaired vision.	Frontal headache (a coincidence ?).
8	M.	59	17 "	Intemperance.	" " "	Legs.	Increased.	"	Dimness of vision due to atrophy of disks.	None.

As to the pathological condition which explains the occurrence of the tendon-reflex in some cases, and its absence in others, we must necessarily be very much in the dark. Such variation must depend, of course, upon the location of the affected regions of the posterior columns. It is quite possible that one of the three kinds of fibres described by Clarke [1] is affected while the others remain intact, and from the fact attested by most observers, that the *funiculi cuneati* are primarily attacked, it seems reasonable to suppose that the horizontal fibres, which probably eventually end in the gray matter of the posterior horns, are those impaired in cases in which the "tendon-reflex" has been extinguished. Pierret [2] has made autopsies in patients who had died before the disease had advanced far into the first stage, and his investigations prove that the external portion of the posterior columns are primarily affected, and not the columns of Goll. The exemption of these parts, or the affection of the extreme posterior portion of the lateral columns, might account for the presence of a normal or even an exaggerated tendon-reflex, but we cannot say, with all the clinical features, that the disease has not been locomotor ataxia in the various exceptional cases brought forward, and these are certainly a goodly number.

2 East Thirty-Third Street, New York, *December* 12, 1878.

[1] British Medical Journal, July to December, 1869.

[2] Archives de Physiologie, 1872, page 364; 1873, page 74. Quoted by Charcot, 1 fasc. 2 series, 1873, page 9.